

Highway Safety Literature

An Announcement
of Recent Acquisitions. . .

HSL No. 71-4
January 29, 1971



THIS ISSUE CONTAINS:
HS-008 436 - HS-008 476

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Washington, D.C. 20591

INTRODUCTION

Publications announced in *Highway Safety Literature* include the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 71 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in location citations by the HS-number, the cover bears the inclusive entry numbers for each issue.

Entries in *HSL* are arranged according to the revised NHTSA Subject Category List shown in the Table of Contents. The List is a two-level arrangement consisting of five major subject fields subdivided into 58 subject groups. Documents related directly to the National Highway Traffic Safety

Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series), NHTSA Compliance Test Reports (HS-610 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration; or for purchase from NTIS (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

SAMPLE ENTRIES

Subject Category Array _____

NHTSA Accession no..... HS-800 218 Fld. 5/21; 5/9

Title of document..... AN INVESTIGATION OF USED CAR SAFETY STANDARDS-SAFETY INDEX: FINAL REPORT. VOL. 6 - APPENDICES G-L

Personal author(s)..... by E. N. Wells; J. P. Fitzmaurice; C. E. Guilliams; S. R. Kalin; P. D. Williams

Corporate author..... Operations Research, Inc., Silver Spring, Md., 015000

Collation _____

Publication date..... 12 Sep 1969 150p
Contract FH-11-6921
Report no. ORI-TR-553-Vol-6; PB-190 523

Abstract..... Appendices G-L to this study of used car safety standards include: indenture model diagrams for classes I-IV motor trucks; degradation, wear, and failure data for motor truck classes I-IV; and safety index tables for classes I-IV motor trucks.

HS-004 497 Fld. 5/19

AUTO THEFT-THE PROBLEM AND THE CHALLENGE

by Thomas A. Williams, Sr.

Journal citation . . . Published in *FBI Law Enforcement Bulletin* v37 n12 p15-7 (Dec 1968)

Gives figures on the extent of the auto theft problem and comments on antitheft devices available now or in the planning stage.

Search terms: Theft, Theft protection, Stolen cars

Search terms: Wear /Trucks;
Failures /Trucks; Used cars; Inspection standards /Trucks; Inspection standards /Data

AVAILABILITY: NTIS

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NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brands names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval by the National Highway Traffic Safety Administration, Department of Transportation of any particular product, course, or equipment.

Harry A. Feinberg
Managing Editor

AVAILABILITY OF DOCUMENTS AND INSTRUCTIONS FOR ORDERING

Department of Transportation personnel may borrow copies of publications directly from the NHTSA. Outside the Washington, D.C. area, phone (202) 426-2768. In Washington, D.C. area, use government ID, phone 118-62768. Non-DOT personnel should contact their company or agency libraries for assistance.

Journals cited may be obtained through most research libraries.

Contractors' reports and other documents can usually be obtained as indicated under AVAILABILITY. However, there is no certainty that retention copies will be available for more than a limited period after a document is issued.

The more common distribution sources are identified by symbols which are explained below:

NTIS: National Technical Information Service (formerly Clearinghouse for Federal Scientific and Technical Information-CFSTI), Springfield, Va. 22151. Order by accession number: *HS, AD, or PB*. Prepayment is required by NTIS (CFSTI) coupon (GPO coupons are not acceptable), check, or money order (made payable to the NTIS). *HC* (Paper copy; full size original or reduced

facsimile) \$3.00 up; *MF* (microfiche approximately 4x6" negative sheet film; reader required) \$0.95.

GPO: Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Give corporate author, title, personal author, and report number. Prepayment is required by GPO coupon (NTIS [CFSTI] coupons are not acceptable), check or money order (made payable to the Superintendent of Documents).

HRB: Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. 20418.

NHTSA: National Highway Traffic Safety Administration General Services Division, Washington, D.C. 20591 (Telephone (202) 426-0874).

SAE: Society of Automotive Engineers, Dept. HSL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report number. Prices given are list; discounts are available to members and sometimes to libraries and U.S. Government Agencies. Prepayment is required; orders without payment are subject to a \$1 handling charge.

IMPORTANT

WHEN REQUESTING a document, to be absolutely sure you receive what you order, give the accession number (HS, PB, AD number) or report number (in cases such as an SAE document), title of report, and the personal or corporate author (whichever is cited). When requesting an HS-numbered document from NTIS (CFSTI), add DOT/ to the prefix HS-; example HS-800 000 should be ordered as DOT/HS-800 000.

SPECIAL NOTICE

NEW PRICES FOR DOCUMENTS AVAILABLE FROM NTIS

On January 1, 1971, the National Technical Information Service (NTIS) increased the prices for documents in certain categories. These increases were made necessary by increased costs. Prices are now as follows:

PAPER COPY

Most documents announced after January 1, 1969, are priced:

1 to 300 pages	\$3.00
301 to 600 pages	6.00
601 to 900 pages	9.00
Over 900 pages	Exception Price

Two years after announcement, documents having 300 pages or less will have a service charge of \$3.00 added to the announced price. No service charge will be added for documents over 300 pages.

Documents announced prior to January 1, 1969, have a service charge of \$3.00 added to the announced price.

MICROFICHE

Microfiche reproduction of documents on a demand basis are priced at 95 cents per document.

Documents available on Standing Order through NTIS Selective Dissemination of Microfiche Service (SDM) are priced at 35 cents per document.

JANUARY 29, 1971

HIGHWAY SAFETY

1/0 ACCIDENTS

1/3 Investigation and Records

HS-008 436 Fld. 1/3

MOTOR VEHICLE DEATH RATE DOWN

by Brenda McCall

Published in *Environmental Control and Safety Management* v140 n1 p10 (Jul 1970)

Appropriations for the fiscal years 1970, 1971, 1972 were approved to carry out provisions of the National Traffic and Motor Vehicle Safety Act of 1966 and to establish research and compliance test facilities. Preliminary statistics for 1970 show a drop in traffic fatalities, a report on tractor fatalities has been called for from DOT.

Search terms: Fatalities /Statistics

HS-008 437 Fld. 1/3; 3/4

"RECKLESS PASSENGERS" TRIGGER HIGHWAY DEATH

by Ben Berkey

Published in *California Highway Patrolman* v34 n6 p14-8 (Aug 1970)

Driver inattention in some form is either a primary or contributing factor in most traffic accidents. Much inattention can be attributed to distractions offered by passengers.

Search terms: Attention lapses / Accident factors; Passengers / Accident factors; Accident causes / Driver behavior

HS-008 438 Fld. 1/3; 5/4

THE SUPERPOWERED KILLERS

by William L. Roper

Published in *California Highway Patrolman* v34 n6 p4-7, 28-31, 36-7, 40-3 (Aug 1970)

Accidents with muscle cars are described. Dean Jeffers' testimony is summarized, on a survey showing that superpowered cars are involved in proportionately more accidents, and costlier accidents, than cars with standard power.

Search terms: High performance automobiles /Accidents rates; High performance automobiles /Accident costs

2/0 HIGHWAY SAFETY

HS-008 439 Fld. 2/0

VOLPE ASKS LAWYERS FOR AID IN CUTTING HIGHWAY FATALITIES

Published in *Transport Topics* n1827 p24 (17 Aug 1970)

Mr. Volpe spoke to the American Trial Lawyers about highway fatalities, the role of alcohol and the need for community backing to enforce alcohol laws, and the importance of safety standards.

Search terms: Fatalities; Highway safety; Drinking drivers /Legal factors

2/4 Design and Construction

HS-008 440 Fld. 2/4

CAN THE GRADE CROSSING PROBLEM BE SOLVED?

by Reginald N. Whitman

Published in *American Road Builder* v47 n7 p6-7 (Jul 1970)

Review of the Alan Voorhees and Associates report on grade crossing problems and their solution.

Search terms: Grade crossings (Highway)

2/8 Police Traffic Services

HS-008 441 Fld. 2/8; 2/9

THE CALIFORNIA HIGHWAY PATROL LEADS THE WAY

by Steven Johnson

Published in *California Highway Patrolman* v34 n6 p32-4 (Aug 1970)

Near Oceanside, California, freeway construction channels four lanes of traffic into two, causing traffic jams. The California Highway Patrol uses

cars with "do not pass me" signs to regulate speed and escort motorists through the hazardous section. The escort service has brought fewer accidents, fewer construction delays, fewer lost man hours, and fewer hot tempers.

Search terms: Construction sites / Police traffic services; Traffic control /Construction sites; Speed control /Construction sites; Passing /Construction sites; Traffic lanes /Construction sites; Hazards /Construction sites

2/9 Traffic Control

HS-008 442 Fld. 2/9

CHP: UP, UP AND AWAY!

Published in *California Highway Patrolman* v33 n11 p28-9 (Jan 1970)

The use of two jet-turbine helicopters in providing traffic supervision and services to motorists is described. Some examples of non-routine duty are given.

Search terms: Helicopters /Aerial surveillance; Traffic surveillance / Helicopters; Emergency services / Helicopters

HS-008 443 Fld. 2/9; 1/3

SAFETY IN HIGHWAY DESIGN AND TRAFFIC CONTROL...BY REDUCTION OF THE NUMBER OF OPPORTUNITIES FOR ACCIDENTS TO OCCUR

by W. R. Blunden

Published in *SAE Australasia* v30 n2 p72-5 (Mar-Apr 1970)

The road system, as the medium for traffic flow and maneuver, provides the exposure base for accident occurrence. Four main aspects of the problem need to be considered: the relationship of the road system to the land use function it supports; the geometrical layout and design of the system; facilities for managing the traffic that uses the system; provision for pedestrian traffic. Under these headings the problems of through traffic and the integrity of local land use functions

2/9 Traffic Control (Cont'd)

HS-008 443 (Cont'd)

are discussed. Other aspects discussed are the relationship between trunk and distributor roads and local street systems with special emphasis on their exposure characteristics; lane characteristics including slow vehicle lanes, medians, overpasses, channelization, traffic signals, and right of way controls; and joint use of the road system by motor vehicles and pedestrians.

Search terms: Traffic flow; Highway design /Land use; Accident risks / Highways; Pedestrian characteristics; Streets /Accident risks; Traffic lanes /Slow moving vehicles; Traffic signals; Medians; Overpasses; Right of way (traffic rules); Channelized intersections; Traffic administration

3/0 HUMAN FACTORS**3/1 Alcohol**

HS-008 444 Fld. 3/1

YOU CAN'T DRIVE THE CAR WITHOUT THE COMBINATION

Published in *Product Engineering* v41 n13 p22-4 (22 Jun 1970)

GM's physiological tester, under study in a research project with the Marquette School of Medicine at Milwaukee, is aimed at keeping people from driving automobiles when their consumption of alcohol or drugs, or their exposure to toxic gases or tension, impairs their driving ability. In a car equipped with this device, when the motorist turns the ignition key, a random number with as many as five digits is displayed on a miniature score board. The numbers then turn off, and a keyboard just below becomes illuminated. The driver has a given number of seconds to push keys in the same sequence as the numbers that had been on display. The average normal individual will be able to do this, and the car will start.

Search terms: Driver intoxication / Driver tests; Driver intoxication / Ignition keys

HS-008 445 Fld. 3/1; 1/3

THE SHOCKING FACTS ABOUT DRINKING AND DRIVING

by William Haddon, Jr.

Published in *California Highway Patrolman* v33 n11 p6-7, 45-7 (Jan 1970)

Reprinted from *Popular Science* v194 n5 p78-81, 212-3 (May 1969), HS-005 068.

Acceptable ways to identify the drunken driver and remove him from the highways could save 25,000 lives each year. The physiological effect of alcohol on driving, alcohol screening tests, and a blood alcohol level rating scale are discussed.

Search terms: Blood alcohol levels; Alcoholism; Drinking drivers /Accident causes; Driver intoxication / Accident causes; Implied consent laws

3/2 Anthropomorphic Data

HS-008 446 Fld. 3/2

APPLIED KINESIOLOGY

by Clayne R. Jensen; Gordon W. Schultz

Published by McGraw-Hill Book Co., New York

1970 381p

An undergraduate text in kinesiology is presented, covering the human muscular system, musculoskeletal action, specific muscle use, and the performance data for various muscular actions.

Search terms: Musculoskeletal system; Physiology; Human factors

3/4 Driver Behavior

HS-008 447 Fld. 3/4

INSTRUMENTED CAR EVALUATES SKILL OF MAN AT THE WHEEL

by John Kolb

Published in *Product Engineering* v41 n11 p51-3 (25 May 1970)

The highway systems research car is described. It was developed first by Greenshields of the University of Michigan and later by Platt of the Ford Motor Company. It measures and records machine control skills of drivers and compares them with desired performance levels.

Search terms: Instrumented vehicles /Driver performance; Driving tasks /Instrumented vehicles; Highway Systems Research Car /Driver performance

HS-008 448 Fld. 3/4

THE WOMAN DRIVER: HOW DOES SHE RATE?

by Ben Berkey

Published in *California Highway Patrolman* v33 n11 p38-40, 43 (Jan 1970)

Describes attitudes of men toward women drivers, including an old editorial on how poorly women handle horses, and a computerized test showing women to have higher attitude scores and men to have higher reaction and alertness scores. In proportion to the amount of driving they do, male drivers have five times the number of accidents women drivers have.

Search terms: Female drivers /Accidents rates; Male drivers /Accident rates; Psychological tests /Female drivers; Psychological tests /Male drivers; Driver attitudes /Male drivers; Driver attitudes /Female drivers

3/5 Driver Education

HS-008 449 Fld. 3/5

HOW I TEACH DRIVER EDUCATION

by Eugene B. Smith

Published in *Safety* v6 n3 p10-1 (May-Jun 1970)

Describes use of a map and trip planning as part of driver education to lend interest.

Search terms: Driver education /Instructional materials; Maps /Driver education; Routes /Driver education

HS-008 450 Fld. 3/5

HOW EFFECTIVE IS YOUR DRIVER-SAFETY PROGRAM?

Published in *Better Roads* v40 p31-3 (May 1970)

It is claimed that driver education and/or defensive driving courses do cut accident rates.

Search terms: Driver education / Accident rates; Defensive driving / Accident rates; Driver education evaluation

3/6 Driver Licensing

HS-008 451 Fld. 3/6; 5/3

SUGGESTED QUESTIONS FOR MOTORCYCLE LICENSING

Motorcycle Industry Council, Washington, D. C., M64400

24p

These questions are presented as a pool from which state and provincial driver license administrators can draw in constructing the knowledge portions of the jurisdiction's motorcycle driver license examination. With the exception of the questions relating to alcohol and driving, the questions deal with motorcycles exclusively.

Search terms: Driver license examination / Motorcycle operators

3/11 Pedestrians

HS-008 452 Fld. 3/11

PEDESTRIAN SAFETY

Published in *Safety* v6 n3 p2-3 (May-Jun 1970)

Reports on various reflective materials and tapes and how they might be used to help cut the 10,000 pedestrian fatalities and 55,000 personal injuries annually.

Search terms: Reflectors / Pedestrian safety; Reflecting surfaces / Accident prevention; Pedestrian fatalities

HS-008 453 Fld. 3/11; 1/3

CARELESS PEDESTRIANS DIE

by Aaron Bell

Published in *California Highway Patrolman* v34 n6 p8-9, 60-2 (Aug 1970)

Pedestrian and motorist actions that result in vehicle-pedestrian collisions are described. There is no such law as "the pedestrian always has the right of way." Early training of children is suggested.

Search terms: Pedestrian accidents; Right of way (traffic rules) / Pedestrians; Children / Pedestrian safety

HS-008 454 Fld. 3/11; 2/9

PARKING ON THE PAVEMENT A GROWING MENACE

by Martin Roth

Published in *Arrive* n1 p7-11 (Winter, 1st Q 1970)

Cars parked half on the pavement and half in the road—their owners seeking to avoid obstructing the traffic by pulling off the road—are a less obvious danger, but often interfere with the free passage of pedestrians. Cars left all night drawn up onto the pavement, because their owners have nowhere else to park them, become an increasingly common sight, especially in the suburbs. They, too, inconvenience pedestrians, and sometimes foul the pavement with oil. What are the legal rights of the pedestrians whose way is obstructed by parked cars? Often it becomes impossible for a pedestrian to pass without stepping into the roadway. What is the legal remedy? There is no short answer to this question. Like much of our legal system, the law relating to roads has developed over a very long period of history. To understand the position, one has to look at the whole picture.

Search terms: Pedestrian vehicle interface / Legal factors; Pedestrian behavior / Parked vehicles

5/0 VEHICLE SAFETY

5/1 Brake Systems

HS-008 455 Fld. 5/1

SPINNING CAR WHEELS ENERGIZE ANTI-SKID BRAKE

Published in *Product Engineering* v41 n17 p52-4 (17 Aug 1970)

New research to perfect a low cost, compact, fast response, antilock skid control for automobiles has been revealed by Mullard Research Laboratories, Redhill, England. A separate antilock control is used at each wheel. Mullard says its system, like others already demonstrated and on the road, consists of both electronic and mechanical components to control brake pressure. Mullard uses a new brake pressure modulating mechanism that obtains energy from the car's spinning wheels.

Search terms: Antilocking devices; Wheel spinning; Brake systems

5/6 Fuel Systems

HS-008 456 Fld. 5/6

DETROIT LOOKS INTO THE FUTURE

by Robert Lund

Published in *Motor* (New York) v134 n1 p50-1 (Jul 1970)

Emission control engineers have forecast the use of the best features of these soon to come items (in addition to engine modifications) to really reduce the automobiles' exhaust pollutants to the vanishing point. These are fuel injection, and exhaust recirculation system and the substitution of a catalytic converter for the present exhaust sound muffler on passenger cars.

Search terms: Air pollution control; Fuel injection; Catalytic converters; Exhaust recycling systems

HS-008 457 Fld. 5/6

HOW TO INSTALL EMISSION-CONTROL KIT IN 5 EASY STEPS

by Mort Schultz

Published in *Motor* (New York) v134 n1 p44-5 (Jul 1970)

Outlines the five general steps involved in installing an exhaust-emission-control kit in vehicles that don't have factory-installed equipment.

Search terms: Exhaust control devices / Instructional materials

HS-008 458 Fld. 5/6

CONVERSION KITS: WHAT THEY'RE ALL ABOUT

by Robert Lund

Published in *Motor* (New York) v134 n1 p44-5 (Jul 1970)

Automobile manufacturers have recently announced development of exhaust-emission-control equipment for older vehicles. The purpose is to reduce by approximately 50% the hydrocarbons, carbon monoxide, and oxides of nitrogen that these cars and light trucks, numbering about 60 million, throw into the air.

Search terms: Exhaust control devices /Used cars; Air pollutants; Air pollution control /Used cars

HS-008 459 Fld. 5/6

CHARACTERISTICS OF PARTICULATE PATTERNS 1957-1966

by Robert Spirtas; Howard J. Levin

National Air Pollution Control Administration, Washington, D. C., N05700

Mar 1970 101p

Report no. Pub-AP-61; PB-192 223

The National Air Surveillance Networks (NASN) have collected samples of suspended particulate matter since 1957. The resulting suspended particulate data are graphically summarized by the application of Whittaker-Henderson Type A curve smoothing formulas to 10 years of data. Data from 60 urban stations and 20 non-urban stations were studied by this technique, which brings out the underlying cyclical patterns and long-term trends in nationwide levels of suspended particulate matter. Seasonal patterns are evident for many urban and nonurban stations, and the seasonal characteristics of the two types of stations contrast sharply. Long-term trends are downward at many center-city urban sites, but are upward at some nonurban sites.

Search terms: Air pollution /Urban areas; Air pollution /Rural areas; Seasons /Air pollutants; Emissions /Air pollutants; Air pollution /Statistics

HS-008 460 Fld. 5/6

NATURE CALLED GREATER POLLUTER THAN MAN

Published in *Clean Air and Water News* v2 n25 p13-4 (17 Jun 1970)

Natural earth processes are by far the principal agents in modifying our environment, according to Dr. William T. Pecora, director of the U.S. Geological Survey, Department of the Interior.

Search terms: Environmental factors; Ecology

HS-008 461 Fld. 5/6

NEWS RELEASE FROM THE OFFICE OF SENATOR NICHOLAS C. PETRIS

7 July 1970 1p

A bill banning the use in California of any smog-producing vehicle engine after July 1, 1975, was approved on July 6, 1970 by the Senate Transportation Committee in an 8-3 vote. The measure by Senator Nicholas C. Petris (Democrat, Oakland) is similar to his bill last year to ban the internal combustion engine. This year the bill has been broadened to include any vehicle engine which produces smog.

Search terms: Air pollution laws /California; Smog /State laws; Internal combustion engines /State laws; Internal combustion engines /Smog

HS-008 462 Fld. 5/6

WHO USES THEM, HOW THEY WORK

by Robert Lund

Published in *Motor* (New York) v134 n1 p43, 52 (Jul 1970)

Except for open and closed PCV systems which have been standard for some time, exhaust emission controls now in use may be divided into two general categories: the kind that injects pressurized air directly into the exhaust manifold to promote further combustion of unburned hydrocarbons and the type that involves modification of ignition and carburetion.

Search terms: Air injection reactor systems; Exhaust control devices; Hydrocarbons /Combustion; Ignition systems; Manifolds

HS-008 463 Fld. 5/6

ROAD VEHICLE POLLUTION

by Alan Mister

Published in *Arrive* n1 p25-8 (Winter, 1st Q 1970)

The emissions of gaseous matter from the exhausts of road vehicles would appear to be of supreme indifference to a high proportion of road users. However, to the less robust, the sensitive and those with amenity consciousness they are an intolerable affront and an ever increasing nuisance. It is to be regretted that the animosity engendered by dark smoke from diesel engines and other gases is not directed at the problem of the road vehicle in our cities for surely it is the continual proliferation of the road vehicle and its demands on living space that should compel our attention. The long term nature of this problem should not hinder us from confronting the nuisance caused by vehicles which can and should be resolved, for not only can gaseous effluent be reduced by improved engine design and more sophisticated carburetor systems, but noise and vibration, surely major pollutants, can be cut drastically.

Search terms: Diesel engines /Emissions; Diesel engines /Smoke; Automotive engineering /Air pollution control; Automotive engineering /Noise control

HS-008 464 Fld. 5/6

AIR POLLUTION AND THE AUTOMOBILE

by James P. Dougherty, Jr.

Published in *Our Sun* v35 n2 p11-4 (Spring 1970)

Scientists in the automotive and petroleum industries and independent researchers have developed and are perfecting technological advancements that will soon virtually eliminate emission pollutants caused by the internal combustion engine.

Search terms: Automotive industry /Emission control; Petroleum industry /Emission control; Internal combustion engines /Emission control

HS-008 465 Fld. 5/6

TEN YEARS TO SAVE THE WORLD

by Paul Ehrlich

Published in *National Enquirer* v44 n29 p10-1 (22 Mar 1970)

Reviews from a 1980 viewpoint, how pollution and congestion brought the world to an end.

Search terms: Air pollution /Forecasting; Ecology /Forecasting; Water pollution /Forecasting

5/10 Lighting Systems

HS-008 466 Fld. 5/10

GENERAL MOTORS CORPORATION (GMC TRUCK AND COACH DIV. PART NO. 3883794), FEDERAL MOTOR VEHICLE SAFETY STANDARD NO. 108, (LAMPS, REFLECTIVE DEVICES, AND ASSOCIATED EQUIPMENT)

Electrical Testing Labs., Inc., New York, E07000

6 Jan 1970 25p

Report no. 411033; PB-189 216

The Signal-Stat Model 175 combination turn signal and hazard warning signal flasher, Part No. 3883794, was examined for identification, and tested for 12-volt operation with the specified maximum hazard warning signal lamp load of six No. 1156 signaling bulbs plus two No. 57 indicator bulbs; the specified minimum hazard warning signal lamp load of two No. 1156 signaling bulbs plus one No. 57 indicator bulb; and the specified turn signal lamp load of three No. 1156 signaling bulbs plus one No. 57 indicator bulb.

Search terms: Warning systems /Performance tests; Turn signals /Performance tests; Lamps /Performance tests; Safety standards /Vehicle lighting; Safety standards /Compliance tests

5/11 Maintenance and Repairs

HS-008 467 Fld. 5/11; 5/6

SERVICING THE FOUR BASIC SYSTEMS

by Robert Lund

Published in *Motor* (New York) v134 n1 p41-2 (Jul 1970)

The alert automotive service outlet can build considerable business with the routine testing and servicing of the one or more emission control devices to be found on all late model U. S. cars. At the same time they can help to cure the internal combustion engine of its harmful case of "bad breath." To keep the four basic types of control devices in good working order, there are several servicing, checking, or maintenance procedures that can be performed quickly, in addition to the regular tuneup or adjustment work.

Search terms: Emission control /Automobile maintenance; Tuneup /Emission control; Internal combustion engines /Emission control

HS-008 468 Fld. 5/11

THE WOMAN'S CAR COMPANION

by William J. Toth

New York Univ., N. Y. Center for Safety, N55200

Published by Birk and Co., Inc.

1970 15p

Tips for women are given on economical safe and trouble-free car operation.

Search terms: Female drivers; Automobile maintenance; Driving

5/14 Occupant Protection

HS-008 469 Fld. 5/14

PROVIDING CONTROLLED COLLISION FACILITIES...BASIS OF DEVELOPING OCCUPANT PROTECTION

by R. A. Burton

Published in *SAE Australasia* v30 n2 p40-8 (Mar-Apr 1970)

This article discusses the nature and severity of the impact tests manufacturers should perform in order to provide the automobile design engineer with information required for minimizing the tendency to occupant injury.

Search terms: Automotive engineering /Occupant protection; Impact tests

HS-008 470 Fld. 5/14

AIR BAGS: HALF SAFE?

Published in *American Motorist* v39 n4 p10 (Aug 1970)

The AAA is deeply concerned that the air bag safety system is, at best, a half safe measure. Enthusiastically supported by the U. S. Department of Transportation, it "involves greater uncertainty and risk to the user than any previous vehicle or highway safety standard," according to AAA Managing Director of Public and Government Relations John de Lorenzi. He raised numerous questions about the controversial air bag system and called for further research and development before its installation on all cars manufactured after January 1, 1972.

Search terms: Air bag restraint systems /Safety standards

HS-008 471 Fld. 5/14

CHILD RESTRAINT SYSTEMS...LAP BELTED CHILDREN MUST BE ABLE TO SEE OUT OF WINDOW

by E. P. Grenier; S. A. Heap

Published in *SAE Australasia* v30 n2 p70-1 (Mar-Apr 1970)

Describes Ford and GM child restraint systems and gives test results on the Ford unit. Rules for use of adult seat belt for a child also are given.

Search terms: Restraint systems /Children

HS-008 472 Fld. 5/14

SEAT BELT CAMPAIGN FAILS

Published in *Public Health Reports* v85 p655 (Jul 1970)

5/14 Occupant Protection (Cont'd)

HS-008 472 (Cont'd)

The total failure of a \$51 million advertising campaign to convince people to use seat belts when driving was recently reported in *Marketing/Communications* magazine. Before the advertising drive began early in 1968, the magazine reported that a study showed 63% of car owners had seat belts installed, and 35% claimed to be using them all or most of the time. After the 18 month campaign, 65% had seat belts in their cars but only 34% used them all or most of the time. During the same period seat belt owners who never or seldom used their belts increased from 39 to 43%. The seat belt campaign may be advertising's biggest flop. (Complete article)

Search terms: Safety campaigns / Seat belt use; Advertising / Seat belt use

5/15 Propulsion Systems

HS-008 473 Fld. 5/15

THE STEAM-POWERED AUTOMOBILE: AN ANSWER TO AIR POLLUTION

by Andrew Jamison

Published by Indiana University Press
1970 166p.

The internal combustion engine is stated to be the major uncontrolled source of air pollution. Various areas such as Los Angeles and New York are discussed, and the effect of pollution on health is detailed. The automotive

industry is charged with failure to act unless forced. A brief history of the steam car is followed by a chapter on Lear's work, activity in California, the role of the federal government, and some other alternatives such as the electric car. The author finds the steam car the only viable alternative coupled with development of mass urban transportation.

Search terms: Internal combustion engines / Air pollution; Air pollution / Los Angeles; Air pollution / New York (City); Air pollution / Health hazards; Steam automobiles; Automotive industry / Federal control; Public transportation / Urban areas; Air pollution control / California; Electric automobiles

HS-008 474 Fld. 5/15

NEW SONY NO CHARGE BATTERY

Published in *Road Test* v6 n8 p58-9 (Aug 1970)

A battery fuel system for electric cars is described.

Search terms: Electric automobiles / Batteries

5/19 Theft Protection

HS-008 475 Fld. 5/19

CAR THIEVES ARE ON THE PROWL

by Aaron Bell

Published in *California Highway Patrolman* v34 n5 p4-5 52-5 (Jul 1970)

Reviews the causes of the increase in auto thefts. Some remedies are discussed.

Search terms: Stolen vehicles

5/22 Wheel Systems

HS-008 476 Fld. 5/22

PAVEMENT WEAR DUE TO STUDDED TIRES AND THE ECONOMIC CONSEQUENCES IN ONTARIO

by P. Smith; R. Schonfeld

Ontario. Dept. of Highways, Downsview (Canada), 013200

Jan 1970 29p
Report no. RR-152

The wear caused by studded tires has been measured on different pavement surfaces in Ontario by using a simple photographic method to record before and after cross sectional profiles. Results show that, with not more than 20 percent of vehicles using studded tires, substantial wear has occurred during one winter of moderate to heavy traffic. Estimates of future pavement wear indicate that a serious problem has to be faced for which no lasting and economical repair or preventive procedures yet exist. Experience in Europe and North America is reviewed in an effort to compare any benefits of studded tires with the widely reported pavement damage they cause. The alternative courses of action—to restrict the use of studs or to allow their continued use—are considered in the light of the findings.

Search terms: Studded tires / Pavement damage; Studded tires / Ontario; Studded tires / Europe; Studded tires / Highway maintenance



executive summary

A SYNOPSIS OF A RECENTLY RELEASED NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION RESEARCH REPORT

DAYTIME MOTORCYCLE HEADLIGHT AND TAILLIGHT OPERATING

The primary objectives of this project were to determine the efficacy of using motorcycle headlights and taillights during the day as a crash avoidance technique, to determine the effect of motorcycle headlight and taillight operation on noticeability, and to assess the adequacy of present motorcycle electrical systems for long periods of daytime headlight and taillight operation.

Contract No. FH-11-7311
The Franklin Institute Research Laboratories
20th and The Parkway
Philadelphia, Pennsylvania 19103
DOT/HS-800 321

Award Amount: \$68,520.00
Date Report Due: 6/20/70
Date Report Rec'd: 10/21/70
Release Date: 12/04/70
PB-195 820

FOREWORD

In performing this study, the Franklin Institute Research Laboratories evaluated the effect of laws requiring the daytime use of motorcycle headlights and taillights on motorcycle detectability, and the effect of extended headlight and taillight operation on motorcycle electrical systems.

The report is presented in one volume consisting of four main sections. Section 1 discusses the goals and objectives of the study and the research approach adopted to meet those objectives. It also summarizes the research reported in Sections 2 through 4, and presents the significant conclusions and recommendations of the study.

Section 2 provides a review of the literature dealing with motorcycles, accidents, costs and benefits; an analysis of motorcycle accident data in the four states having daytime headlight laws and in four control states; a review of dealer records in these four states and in Pennsylvania to determine the effect of daytime motorcycle headlight and taillight operation on repair and maintenance; and a cost-benefit analysis.

Section 3 reports on the design and findings of the experiments conducted by the Franklin Institute Research Laboratories to determine the effect of the daytime operation of motorcycle headlights and taillights on the noticeability of motorcycles by drivers of other vehicles.

Section 4 presents an evaluation of the effect of extended use of headlights and taillights on motorcycle electrical systems, including test philosophy, parameters that were measured, design of test equipment and test plan, and the results obtained from these experiments.

Supporting data is also presented.

MAJOR FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

MOTORCYCLE ACCIDENT DATA

- In 1968, 2.1 million registered motorcycles travelled over 8 billion miles. Of that number, 252,000 were involved in traffic accidents which accounted for 1900 fatalities and about 200,000 injuries. The motorcycle death rate of 0.23 per million miles of travel is nearly 5 times the rate for all motor vehicles. The cost of these motorcycle accidents ranged from \$550 million to \$805 million — equivalent to a cost of \$2200 to \$3200 per motorcycle accident involvement.
- A number of studies have shown that the daytime use of headlights or running lights reduces motor vehicle accidents, increases the perceptibility of motor vehicles, and improves lane position. A survey conducted in Wisconsin found that daytime operation of motorcycle headlights helped motorists

to see motorcyclists better in both urban and rural traffic. Other studies have suggested that present motor vehicle taillight systems may be inadequate and that different taillight configurations may be required to increase vehicle noticeability. These studies may provide guidance for designing better motorcycle taillight systems.

- In four states with daytime motorcycle headlight laws (Indiana, Montana, Oregon and Wisconsin), there was a 3.8 percent difference between the reduction of daytime and nighttime accidents as a result of these laws. By applying the 3.8 percent figure to the entire United States, an annual projected reduction of 7140 motorcycle accident involvements is obtained at a cost savings ranging from about \$15.7 million to \$22.8 million or from \$7.50 to \$10.90 per registered motorcycle.
- Contacts with dealers in the four above states and in Pennsylvania, together with the results obtained in the electrical systems evaluations, indicated that most motorcycles appear to have adequate electrical systems capable of sustaining extended daylight headlight and taillight operation. Bulb replacement for these motorcycles will increase repair costs by about \$3 per year. Motorcycles with marginal electrical systems will have their costs increased by between \$7 and \$14 per year, with an average of about \$11 per year, mainly for bulb and battery replacement and battery recharging, depending on the method of cost calculation. Benefit-to-cost ratios for motorcycles with adequate electrical systems will range from 2.4 to 3.5 with an average of approximately 3; for those with marginal systems, the ratios will fall between 0.5 and 1.5 with an average of approximately 0.8.

MOTORCYCLE NOTICEABILITY EXPERIMENTS

- Three sets of motorcycle noticeability experiments were designed, conducted and evaluated: (1) Front-light experiments, (2) rear-light experiments, and (3) distance versus noticeability experiments. All experiments were conducted in the Philadelphia area. The four front-light experiments evaluated both high- and low-beam motorcycle headlights and amber running lights. Stratification also included weather, color of helmet, and distance to opposing traffic.

The results showed that daytime operation of motorcycle headlights significantly increases noticeability between 44 and 142 percent, depending on the traffic situation. When stratified by weather conditions, the relative effectiveness of the headlight is substantially greater during cloudy weather than during clear weather. By using front amber running lights in lieu of a headlight, approximately one-half of the increase in noticeability is obtained. Thus, motorcycle headlights or front running lights appear to be valuable as a cue for alerting motorists to the presence of a motorcycle during day.

- The three rear-light experiments evaluated standard taillights and brake lights and modifications by intensity, mounting height, number of lights, color, and contrasting background. Red taillights, even when modified by all the preceding parameters other than color, do not significantly increase the noticeability of motorcycles and thus appear to be inadequate as cues for alerting motorists to their presence during the day. Only dual amber taillights were found to improve noticeability, similar to front running lights.
- The distance as opposed to noticeability experiments revealed that when motorcycle headlights operate during the daylight, drivers of other vehicles will notice the motorcycle sooner and at greater distances and are thus better able to take any necessary evasive action.

MOTORCYCLE ELECTRICAL SYSTEMS EVALUATION

- Contracts with motorcycle dealers in the Philadelphia area and in four states with daytime motorcycle headlight laws, contacts with the national offices of several motorcycle manufacturers, and a survey of available technical literature showed that the state of motorcycle electrical system standardization was such that an experimental approach to evaluating these systems would be more feasible than a purely analytical approach.

- A test plan in which the test vehicle served as its own control was designed and implemented. It was decided to direct testing to systems which dealers and manufacturers judged to be marginal or inadequate.
- A review of typical motorcycle electrical systems pointed out the high degree of dependence of the charge-discharge cycle on the driving pattern and showed the importance of incorporating such patterns into laboratory tests to obtain meaningful results. A reasonable, worst-case model of driving within the city limits of Philadelphia was developed from field testing to provide a single set of start, stop and run conditions under which all motorcycles would be evaluated. A test facility capable of operating motorcycles continuously and automatically through start, stop, and run cycles was designed and fitted to the worst-case model. Carefully selected voltages and currents within each electrical system were continuously recorded and intermittent measurements performed to determine battery condition so that the operational characteristics of each system under test could be determined.
- All output data was plotted on a common time axis so that meaningful comparison could be made. A linear regression analysis was run on all collected data and the least-square-fit line plotted as a function of time to establish overall system trends for both control (lights off) and performance (lights on) tests.
- Five motorcycles were tested. The electrical system of one of these motorcycles was considered superior by the dealers and manufacturers' representatives, and the systems of the other four were considered marginal. The "superior" electrical system proved to be more than adequate, one of the marginal systems just adequate, and the other three displayed varying degrees of degradation. In all cases, no individual component failure occurred. The major factor contributing to performance degradation was insufficient alternator output. The two machines showing the greatest degradation were used units, indicating a possible degradation in performance from normal use.

- The results of this portion of the study revealed that present motorcycle electrical systems are adequately designed for short term, intermittent lamp operation and that the majority of systems can withstand extended lamp operations. However, to ensure adequate performance under continuous lights-on operation for marginal electrical systems, these systems must be designed to supply the total ignition and lamp load plus the recommended battery charging current.

SIGNIFICANT CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- Daytime motorcycle accidents can be significantly reduced by the use of motorcycle headlights and taillights during the day. However, the headlight appears to be more effective than the taillight in reducing daytime motorcycle accidents.
- Motorcycle noticeability can be significantly improved by daylight headlight operation. Other motorists will be able to identify motorcycles with headlights operating sooner and at greater distances.
- Red taillights, even modified by number, mounting height, intensity and contrasting background, do not increase the noticeability of motorcycles.
- Dual amber front and rear running lights provide some increase in motorcycle noticeability, but not as much as the headlight.
- Most motorcycles appear to have adequate electrical systems. Increased costs caused by extended daytime headlight and taillight use will be negligible; for marginal systems however, average annual repair and maintenance costs will increase by between \$7.00 and \$14.00 per motorcycle.
- For motorcycles with adequate electrical systems, the benefit-to-cost ratio is considerably greater than 1; for motorcycles with marginal electrical systems, the average benefit-to-cost ratio is approximately 0.8.
- There is a lack of standardization in the types of electrical systems or components used by motorcycle manufacturers.

- The greatest deficiency found in the electrical systems of motorcycles which operate marginally under "lights on " condition is insufficient alternator capacity.

Recommendations

- States should be encouraged to adopt daytime motorcycle headlight laws.
- Motorcycle manufacturers should be required to provide electrical systems which are adequate for extended daytime operation of headlights and taillights.
- Further research is needed to better understand the effects of daytime motorcycle headlight and taillight operation on motorcycle noticeability, driver behavior, and traffic flow and to determine optimum front and rear motorcycle lighting configurations.

- As more states pass daytime motorcycle headlight laws, further analysis of state accident data should be undertaken to gain better insight into the effectiveness of daytime headlight laws on motorcycle accidents.

The Contract Manager has certified that the contractor's work has been satisfactorily completed and that all contractual obligations have been met.

The opinions, findings, and conclusions expressed in this summary are those of the contractor and not necessarily those of National Highway Traffic Safety Administration.

Availability: NTIS (formerly Clearinghouse - CFSTI), U.S. Department of Commerce, Springfield, Va. 22151. Order DOT/HS-800 321 or PB-195 820 in papercopy (HC) or microfiche(MF).

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